PC37.113

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Type of Project: Revision to IEEE Standard C37.113-1999
PAR Request Date: 09-Oct-2011
PAR Approval Date: 07-Dec-2011
PAR Expiration Date: 31-Dec-2015
Status: PAR for a Revision to an existing IEEE Standard
Root Project: C37.113-1999

1.1 Project Number: PC37.113
1.2 Type of Document: Guide
1.3 Life Cycle: Full Use

2.1 Title: Guide for Protective Relay Applications to Transmission Lines

Changes in title: ~~IEEE~~ Guide for Protective Relay Applications to Transmission Lines

3.1 Working Group: Working Group for Protective Relaying Ap. To Transmission Lines (PE/PSR/C37.113_WG-D19)
Contact Information for Working Group Chair
Name: Richard Taylor
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None

3.2 Sponsoring Society and Committee: IEEE Power and Energy Society/Power System Relaying (PE/PSR)
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 06/2013
4.3 Projected Completion Date for Submittal to RevCom: 10/2014

5.1 Approximate number of people expected to be actively involved in the development of this project: 50

5.2 Scope: Concepts of transmission line protection are discussed in this guide. Applications of these concepts to various system configurations and line termination arrangements are presented. Many important issues, such as coordination of settings, operating times, characteristics of relays, mutual coupling of lines, automatic reclosing, and use of communication channels, are examined. Special protection systems, multi-terminal lines and single phase tripping and reclosing are also included. The impact that system parameters and system performance have on the selection of relays and relay schemes is discussed as well.

Changes in scope: ~~Produce~~Concepts ~~a~~of transmission line protection are discussed in this guide. ~~for~~Applications ~~protective~~of ~~relay~~these ~~applications~~concepts to ~~transmission~~various system configurations and line termination arrangements are presented. Many important issues, such as coordination of settings, operating times, characteristics of relays, mutual coupling of lines, automatic reclosing, and use of communication channels, are examined. Special protection systems, multi-terminal lines and single phase tripping and reclosing are also included. The impact that system parameters and system performance have on the selection of relays and relay schemes is discussed as well.

5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: The purpose of this guide is to provide protection engineers with information that helps them to properly apply relays and other devices to protect three-phase high-voltage transmission lines.

Changes in purpose: ~~Provide~~The ~~a~~purpose ~~reference~~of ~~document~~this guide is to ~~be~~provide ~~utilized~~protection ~~by~~engineers ~~those~~with ~~responsible~~information ~~for~~that ~~the~~helps ~~relay~~them ~~protection~~to ~~of~~properly apply relays and other devices to protect three-phase high-voltage transmission lines.

5.5 Need for the Project: Each electrical component has protection problems unique to itself but the concepts associated with transmission line protection are fundamental to all other electrical devices and provide an excellent starting point to examine and appreciate the implementation of all power system protection. Because transmission lines are links to adjacent lines and/or other equipment connected to them, study of transmission line protection leads to a better appreciation of protection related issues. Electrical engineers and technologists working with electric power utilities, consultants and manufacturers in general and those working in designing, selecting and maintaining protection systems would benefit from the

information provided in this guide.

5.6 Stakeholders for the Standard: Electrical engineers and technologists working with electric power utilities, consultants and manufacturers in general and those working in designing, selecting and maintaining protection systems.

Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

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7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes (Item Number and Explanation): The study of transmission line protection offers an opportunity to examine many fundamental relaying considerations that apply, in one degree or another, to the protection of other types of power system equipment. Each electrical element, of course, will have protection problems unique to itself; however, the concepts associated with transmission line protection are fundamental to all other electrical devices and provide an excellent starting point to examine and appreciate the implementation of all power system protection. The basic relaying characteristics of reliability, selectivity, local and remote backup, zones of protection, coordination, and speed represent in almost all relaying situations. This guide specifically addresses these concepts for transmission line protection, but the ideas are universally applicable. Since transmission lines are also the links to adjacent lines or connected equipment, the protection provided for transmission lines must be compatible with the protection provided for all of these other elements. This requires coordination of settings, operating times, and characteristics. Individual relays, such as overcurrent, directional, and distance, as well as the total protection package, including the communication channels, are all examined in this guide, with appropriate discussion relating to their application and their particular advantages and disadvantages. Special topics, such as the effects of series capacitors or static voltampere reactive (var) systems and consideration for tripping versus blocking during system power swing conditions, are also discussed.
In addition to the protection of the line itself, consideration is given to the various system configurations and bus arrangements, mutually coupled lines, reclosing, and the impact that system performance and parameters have on the selection of relays and relay schemes. Special protection systems, multi-terminal lines, and single-phase tripping are among the topics covered.
Some comments and background discussion previously included in the scope have been removed. This information will be merged with the overview and other sections in the revised standard. The current version of the guide will be updated in the light of major outages experienced in North America and Europe during the previous couple of years.
The following will be the text of the scope of the guide.
"Concepts of transmission line protection are discussed in this guide. Applications of these concepts to various system configurations and line termination arrangements are presented. Many important issues, such as coordination of settings, operating times, characteristics of relays, impact of mutual coupling of lines on the protection systems, automatic reclosing and use of communication channels are examined. Special protection systems, multi-terminal lines and single phase tripping and reclosing are also included. The impact that system parameters and system performance have on the selection of relays and relay schemes is discussed as well."